REAR DERAILLEUR

This application is based on application No. 2002-350251 filed in Japan, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a rear derailleur to be used as an exterior derailleur of a bicycle.

Description of the Related Art

[0002] As the exterior derailleur for a bicycle, a derailleur is used. The derailleur is a device for speed-changing the bicycle by looping a chain which is looped over one of a plurality of chain wheels arranged concentrically over another chain wheel. An example of the derailleur which has been mainly used for the bicycle currently has been disclosed in a number of patent literatures such as WO96/24787 and Japanese Patent Laid-Open No. 2000-247284.

[0003] Such a derailleur, particularly the rear derailleur is provided with a tension arm, a freely-pivotable base portion of which is biased in one direction of rotation, and which is biased in the opposite direction by a parallel rocking member provided through a pantagraph mechanism, and two sprocket wheels

are rotatably supported by this tension arm. Over these two sprocket wheels (guide sprocket wheel and tension sprocket wheel) and the chain wheel, there is looped a chain, and a guide sprocket wheel side closer to the above-described chain wheel is moved toward the front of any one of the above-described plurality of chain wheels (at this time, the tension sprocket also moves together) by the above-described pantagraph mechanism, whereby the chain is replaced.

[0004] Sag of the chain caused by the replacement is absorbed by combination of two pivot movement in which the pantagraph mechanism and the parallel rocking member integrally pivot and the tension arm provided further at a tip end of the parallel rocking member pivots. For this reason, the operation is complicated and this has suffered from problems in terms of balance, durability and the like.

[0005] Also, parts of bicycles have been standardized, and a user selects any appropriate wheels from among many sizes in accordance with his own size or a site of use for use in the same manner as other parts. At this time, since some rear derailleurs cannot cope with small wheels, wheels of a desired size could not be selected sometimes.

SUMMARY OF THE INVENTION

[0006] Conventionally, since the rear derailleur absorbs sag

of the chain by combination of two pivot movement as described above, when the chain is looped over a rear chain wheel of major diameter, a tension sprocket wheel provided at the tip end of the tension arm is to come closer to the ground. Particularly, in the case of a multiple derailleur gear having also a front derailleur in addition to the rear derailleur, if a front chain wheel of minor diameter and a rear chain wheel of major diameter are selected, it is located at right angles to the ground, and therefore, the tension sprocket wheel is to come further closer to the ground.

[0007] When the tension sprocket wheel comes closer to the ground, this tension sprocket wheel collides with stones at ends of a road or catches plants in the chain, whereby there is increased a possibility of an accident due to a violent fall or trouble of the derailleur gear itself occurring.

[0008] It is a problem of the present invention to provide a rear derailleur having structure in which even when the chain has been looped over a chain wheel of major diameter, the chain sprocket wheel does not come so closer to the ground in views of the above-described problems and to thereby reduce accidents of a violent fall or trouble. It is a problem to facilitate detachment and attachment of the wheel, to provide a rear derailleur having a wide application range to wheel size, and to simplify a chain replacement operation during speed variation

for improving the durability.

[0009] The above-described problems are solved by the following means. That is:

[0010] Solution means of the first invention is a rear derailleur for a bicycle, comprising: a base member having an installation area for installing to a bicycle body; a parallel rocking member; a pair of parallel cranks interposed between the base member and the parallel rocking member, for constituting an actual parallel link mechanism together with those; a guide arm provided so as to be freely rockable around a first rocking axis parallel with a rear wheel axle axis on the parallel rocking member; a guide sprocket provided so as to be freely rotatable around an axis parallel with the first rocking axis on the guide arm; a tension arm provided so as to be rockable around a second rocking axis parallel with the rear wheel axle axis on the parallel rocking member; a tension sprocket provided so as to be freely rotatable around a parallel axis with the second rocking axis on the tension arm; and a biasing spring provided between the tension arm and the parallel rocking member in order to bias the tension sprocket toward the rear of the bicycle.

[0011] Solution means of the second invention is a rear derailleur, wherein in a rear derailleur according to the first invention, a link rocking axis which the parallel link mechanism rocks is orthogonal to the rear wheel axle axis.

[0012] Solution means of the third invention is a rear derailleur, wherein in a rear derailleur according to the first invention, the link rocking axis which the parallel link mechanism rocks is inclined toward the rear wheel axle axis.

[0013] Solution means of the fourth invention is a rear derailleur, wherein in a rear derailleur according to the first invention, the first rocking axis is located at a side forward of a bicycle as compared with the second rocking axis.

[0014] Solution means of the fifth invention is a rear derailleur, wherein in a rear derailleur according to the first invention, the distance on the tension arm between the second rocking axis and the axis of the tension sprocket is longer than that on the guide arm between the first rocking axis and the axis of the guide sprocket.

[0015] Solution means of the sixth invention is a rear derailleur, wherein in a rear derailleur according to the first invention, the installation area has a through hole for passing through a fixing bolt when installing to the bicycle body.

[0016] Solution means of the seventh invention is a rear derailleur, wherein in a rear derailleur according to the first invention, a cable pulley over which a control cable is looped is provided rotatably relative to the base member.

[0017] Solution means of the eighth invention is a rear derailleur, wherein in a rear derailleur according to the seventh

invention, the cable pulley is provided with a roller bearing for reducing friction due to the rotation.

[0018] Solution means of the ninth invention is a rear derailleur, wherein in a rear derailleur according to the seventh invention, the through hole and the cable pulley are concentric.

[0019] Solution means of the tenth invention is a rear derailleur, wherein in a rear derailleur according to the seventh invention, the above-described through hole and the above-described cable pulley are offset.

[0020] Solution means of the eleventh invention is a rear derailleur, wherein in a rear derailleur according to the first invention, the base member can be pivotally installed to the bicycle body through the through hole and this base member is provided with an adjustable stopper in order to limit its pivot position relative to the bicycle body.

[0021] Solution means of the twelfth invention is a rear derailleur, wherein in a rear derailleur according to the first invention, the installation area is a bracket member independent of the base member body, and this base member body is pivotally installed to this bracket member.

[0022] Solution means of the thirteenth invention is a rear derailleur, wherein in a rear derailleur according to the twelfth invention, the base member is provided with an adjustable stopper in order to limit its pivot position relative to the bracket

member.

[0023] Solution means of the fourteenth invention is a rear derailleur, wherein in a rear derailleur according to the first invention, one of the parallel cranks is provided with cable fixing means for fixing a control cable.

[0024] Solution means of the fifteenth invention is a rear derailleur, wherein a rear derailleur according to the first invention has been installed to the bicycle body through the installation area and to a rear wheel axle, a plurality of rear chain wheels, the chain of which is replaced, are coaxially fixed by means of this rear derailleur.

[0025] Solution means of the sixteenth invention is a bicycle, wherein in a bicycle according to the fifteenth invention, to a pedal crankshaft which this bicycle has, there are fixed a plurality of front chain wheels coaxial thereto and there is provided a front derailleur for replacing the chain.

[0026] Other objects and advantages besides those discussed above shall be apparent to those skilled in the art from the description of a preferred embodiment of the invention which follows. In the description, reference is made to accompanying drawings, which form a part thereof, and which illustrate an example of the invention. Such example, however, is not exhaustive of various embodiments of the invention, and therefore reference is made to the claims which follow the

description for determining the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate embodiments of the invention and together with the description, serve to explain the principles of the invention:

[0028] Fig. 1 is a schematic diagram for a bicycle for explaining an embodiment according to the present invention, and a view in common for all embodiments;

[0029] Fig. 2 is an external appearance view when a rear derailleur 172 and a frame 11 according to a first embodiment are viewed from the side;

[0030] Fig. 3 is a schematic diagram when the rear derailleur 172 and the frame 11 according to the first embodiment are viewed from behind the bicycle;

[0031] Fig. 4 is an explanatory view showing the rear derailleur 172 removed alone;

[0032] Fig. 5 is a partial diagrammatic view showing an installation area 111 of the derailleur of the frame 11;

[0033] Fig. 6 is a longitudinal sectional view showing a base member 21;

[0034] Fig. 7 is a view showing partial sectional structure of installation areas of a parallel rocking member 22 and a

tension arm 24 attached thereto;

[0035] Fig. 8 is an explanatory view showing a state of the rear derailleur 172 which varies in response to the speed variable state;

[0036] Fig. 9 is an explanatory view showing a state of the rear derailleur 172 which varies in response to the speed variable state;

[0037] Fig. 10 is an explanatory view showing a state of the rear derailleur 172 which varies in response to the speed variable state;

[0038] Fig. 11 is an external appearance view showing a state in which the entire rear derailleur has been pivoted;

[0039] Fig. 12 is a view showing an example (second embodiment) of the rear derailleur 172 in which a control cable with guide tube has been used; and

[0040] Fig. 13 is an external appearance view showing the rear derailleur according to a third embodiment as a single unit.

[0041] Fig. 14 is an external appearance view when the rear derailleur 172 according to the fourth embodiment and the frame 11 are viewed from the side; and

[0042] Fig. 15 is an explanatory view illustrating a pulley bracket 6 according to the fourth embodiment.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0043] Hereinafter, the description will be made of embodiments according to the present invention.

First Embodiment

* Outline Of Bicycle To Which The Present Rear Derailleur Is Installed

[0044] Fig. 1 is a schematic diagram for a bicycle 1 for explaining an embodiment according to the present invention, and a figure in common for all embodiments. The bicycle 1 has: a frame 11; a handlebar shaft 141; a fork 121; a front wheel 12; a handlebar 14; a saddle 15; a pedal crank 161; a pedal 162; a front chain wheel 16; a rear chain wheel 17 and a chain 18.

[0045] In the same manner as an ordinary bicycle, the frame 11 is substantially quadrangular; on one apex thereof, there is pivotally supported the handlebar shaft 141; and at a lower end of the handlebar shaft 141, there is provided the fork 121. At a tip end of the fork 121, there is provided the front wheel 12 so as to be freely rotatable. At the upper end of the other end of the handlebar shaft 141, there is fixed the handlebar 14 for handling the bicycle 1.

[0046] At another apex of the frame 11, there is provided a crankshaft so as to be rotatable relative to the frame 11, and the plurality of front chain wheels 16 are fixed to the

crankshaft concentrically. At both ends of the crankshaft, there are fixed the pair of pedal cranks 161, and at the other ends of the pedal cranks 161, there are fixed the pedals 162. Also, at another apex of the frame 11, there is provided the saddle 15.

[0047] At the remaining apex of the frame 11, there are coaxially provided the plurality of rear chain wheels 17 through a free wheel (not shown). In the neighborhood of this apex, there is provided a rear derailleur 172, and over a guide sprocket wheel 231, a tension sprocket wheel 241 (to be described later), the rear chain wheel 17 and the front chain wheel 16 which this rear derailleur 172 has, there is looped the chain 18.

* Structure of Rear Derailleur

[0048] The description will be made of an example of the rear derailleur 172 suitable to be used for the frame 11 equipped with an installation area 111 of derailleur for the exclusive use. Fig. 2 is an external appearance view when these rear derailleur 172 and frame 11 are viewed from the side, and Fig. 3 is a schematic diagram when these are viewed from behind the bicycle. Also, Fig. 4 is an explanatory view showing alone the rear derailleur 172 removed, and Fig. 5 is a partial diagrammatic view showing an installation area 111 of the derailleur of the frame 11 having the above-described structure. In this respect, in Fig. 3, positional relationship on the parallel rocking member

22 between a guide arm rocking axis 232 and a tension arm rocking axis 243 is not represented accurately because this figure is for explaining speed variation due to a parallel link mechanism.

[0049] As shown in Fig. 5, the derailleur installation area 111 is a structural portion which has protruded below an axle installation area 113 of the frame 11, and has a derailleur installation hole 1121 with a female thread cut therein and a stopper 1122. When the rear derailleur 172 has been installed to the frame 11 by a base member 21, a center line of the derailleur installation hole 1121 is to coincide with a derailleur rocking axis 1721 as described later.

[0050] Fig. 6 shows a longitudinal cross-sectional view of the base member 21. The base member 21 is provided with a protrusion portion 213 having a female thread in which a stopper 252 is screwed, and a through hole 212 for passing through a derailleur installation bolt 211. Also, on the side surface of the base member 21, there are installed a pair of parallel cranks 221 in such a manner as to be freely rockable.

[0051] The base member 21 is installed by screwing a derailleur installation bolt 211 into the derailleur installation hole 1121 through the through hole 212. Also, a cable pulley 251 is installed around the derailleur installation bolt 211 through a pulley bearing 2511 in such a manner as to be freely pivotable. In the case of Fig. 6, the plain bearing is shown in the pulley

bearing 2511, and it is also possible to use a rolling type bearing such as a ball bearing.

[0052] With this structure, the base member 21 and the cable pulley 251 are independently rotatable relative to the frame 11. When the base member 21 pivots, the stopper 252 provided on the base member 21 and a stopper 1122 provided on the frame abut against each other, whereby the base member 21 stops at a fixed angular position. Since an amount of protrusion of the stopper 252 can be adjusted by turning it, a stop angular position of the base member 21 can be adjusted. In this respect, with exception of during disassembly and assembly, these two stoppers maintain the abutted state, that is, when the bicycle is usually used, these stoppers remain contacted including during speed variation.

[0053] Fig. 7 shows partial cross-sectional structure showing an installation area of a parallel rocking member 22 and a tension arm 34 installed thereto. Each end of one of parallel cranks 221 is axially supported by the parallel rocking member 22. For this reason, the base member 21, the parallel rocking member 22 and a pair of parallel cranks 221 which connect these together constitute the parallel link mechanism. As shown in Fig. 3, therefore, the parallel rocking member 22 is capable of changing their relative positions without changing an angle relative to the base member 21, and changing the rear chain

wheel 17 with which the chain 18 looped over the guide sprocket wheel 231 engages. In this respect, in order to fix an end portion of a control cable 25 for the speed variation operation, there is provided a cable end fixing member 2211 at one of the parallel crank 221, and by operating the control cable 25, the position of the above-described parallel rocking member 22 is changed (See Figs.2, 4 and the like).

[0054] To the parallel rocking member 22, there is fixed a cylindrical biasing spring pot 223. The biasing spring pot 223 has a space 2231 therein, in which a coil-shaped biasing spring 242 is contained. One end of the biasing spring 242 is restrained within the pot while the other end is restrained by the tension arm 24. To the tension arm 24, there is fixed a tension arm shaft 244 having an annular groove 2441. This tension arm shaft 244 penetrates the biasing spring 242 and is inserted into the above-described biasing spring pot 223, and is permitted to rotate by means of a dislocation preventing pin 245 and the annular groove 2441, but is prevented from coming off. Since a torsional force is imparted to the biasing spring 242 for assembly, the tension arm 24 is rotatable around a tension arm rocking axis 243 (second rocking axis) relative to the parallel rocking member 22, and the biasing spring 242 is to impart a biasing force (biasing force which is going to bend toward the rear of the bicycle in the installed state) in a fixed direction.

[0055] Also, as shown in Fig. 4 and the like, a guide arm 23 is provided around the guide arm rocking axis 232 (first rocking axis) on the parallel rocking member 22 so as to be freely rockable. On the guide arm 23 and the tension arm 24, a guide sprocket wheel 231 and a tension sprocket wheel 241 are supported so as to be freely rotatable respectively. The distance on the tension arm 24 between the tension arm rocking axis 243 (second rocking axis) and the axis of the tension sprocket wheel 241 is preferably made longer than that on the guide arm 23 between the guide arm rocking axis 232 (first rocking axis) and the axis of the guide sprocket wheel 231. Also, the guide arm rocking axis 232 is preferably located at a side forward of the bicycle as compared with the tension arm rocking axis 243. Thus, as described above, it is a feature of the present invention that the guide arm 23 and the tension arm 24 are rockable independently of each other on the parallel rocking member 22.

* Rear derailleur and speed variation state

[0056] Figs.8, 9 and 10 are explanatory views for showing states of the rear derailleur 172 which varies in response to the speed variation state.

[0057] Fig. 8 shows a case in which wheels of minor diameter have been selected for both the front chain wheel 16 and the rear chain wheel 17, and both the guide arm 23 and the tension arm 24 revolves large toward the rear of the bicycle. Great

sag of the chain 18 caused by the wheel of minor diameter selected is almost all absorbed particularly by revolution of the tension arm 24.

[0058] Fig. 9 shows a case in which the front chain wheel 16 of major diameter and the rear chain wheel 17 of minor diameter have been selected, and some length of the chain 18 has been consumed by the front chain wheel 16 and the amount thus consumed is absorbed by downward revolution of the tension arm 24. Even in this case, it is necessary to pay attention to that the position of the tension arm rocking axis 243 has hardly been changed. In the conventional case, since revolution of the parallel rocking member 22 (equivalent member) is combined with revolution of the tension arm and h (height between the ground and the tension sprocket wheel) shown in Fig. 1 becomes extremely small, the above-described trouble of a violent fall or plants caught has been prone to occur. In the present invention (and embodiments), however, since the parallel rocking member 22 does not revolve (rock) because of speed variation, but the above-described h can be taken large, such a problem becomes difficult to take place.

[0059] Fig. 10 shows a state of the rear derailleur 172 when for both the front chain wheel 16 and the rear chain wheel 17, wheels of major diameter have been selected. The guide arm 23 revolves large to match with the rear chain wheel 17 of major

diameter, and the tension arm 24 revolves further larger ahead than in the case of Fig. 9. Even in this case, the position of the tension arm rocking axis 243 has hardly been changed. Also, during the speed variation, the distance between the guide sprocket wheel 231 and the tension sprocket wheel 241 has been changed, whereby when the front chain wheel 16 and/or the rear chain wheel 17 over which the chain 18 is looped have been changed, sag of the chain which changes depending upon these diameters is absorbed.

[0060] As described above, in this rear derailleur 172, it can be seen that since the tension sprocket wheel 241 is not so close to the ground over the entire range of speed variation, the trouble of a violent fall or trees and plants caught becomes very difficult to occur. Further, even if the front chain wheel 16 over which the chain is looped may be changed over a range from minor diameter to major diameter, a guide sprocket 231 automatically settles in the most stable position corresponding to this diameter and no unreasonable force is exerted, and therefore, it is possible to maintain a stable speed variation operation.

* Assembly, Disassembly, Adjustment and Cable Pulley

[0061] Fig. 11 is an explanatory view showing a state when the entire rear derailleur 172 has forcibly been caused to pivot against the biasing spring 242 in the base member 21 during

assembly or disassembly. As described already, the cable pulley 251 has been made freely rotatable relative to the base member 21 and the frame 11. As shown in Fig. 2, the control cable 25 coming from the front portion of the frame 11 is looped over the cable pulley 251, and thereafter, an end portion thereof is fixed to the cable end fixing member 2211 provided at the parallel crank 221.

[0062] The control cable 25 is drawn, whereby the parallel crank 221 is caused to rock within a range from the solid line to the dotted line of Fig. 3 and the guide sprocket wheel 231 is located forward of any one of the rear chain wheel 17. Since the cable pulley 251 is supported through the pulley bearing 2511, friction when the control cable 25 is operated is reduced. By locating the guide sprocket wheel 231, the rear chain wheel 17 with which the chain 18 engages is changed.

[0063] The base member 21 has been made pivotable relative to the frame 11, and when the chain 18 is looped (in normal times), by means of a biasing force of the biasing spring 242, two stoppers (1122 and 252) are biased in a direction that causes them to abut against each other and are in a state shown in Fig. 2 and the like. Since this state has been brought about by the biasing force of the biasing spring 242, against this, the entire rear derailleur 172 can be rotated. Fig. 11 shows a state in which the entire rear derailleur 172 has been thus

caused to pivot.

[0064] The entire rear derailleur 172 is caused to pivot (in clockwise direction), whereby sag can be imparted to the control cable 25 as shown in Fig. 11. Since usually, the control cable 25 has been stretched in such a manner as to cross a direction that opens the axle installation area 113, when the axle is going to be removed, it cannot be easily removed because the control cable 25 interferes with. The present rear derailleur 172 is capable of causing the entire rear derailleur 172 to pivot as described above, imparting sag to the control cable 25 and retracting to a position that presents no obstacle to wheel removal as indicated by the dotted line by taking advantage of the sag. Thereby, it becomes very easy to remove the wheel.

[0065] In this first embodiment, relative positions of the derailleur rocking axis 1721, the tension arm rocking axis 243 and the guide arm rocking axis 232 have been arranged in a triangular shape, and as regards these arrangement positions, it is possible to freely design such as, for example, arranging on a straight line. Also, conventionally, since two biasing springs have been used in order to absorb the sag of the chain 18, it has been very troublesome to set (design) the interrelationships among these spring forces. In this rear derailleur 172, however, since only a single biasing spring 242 has been used, it is not necessary to take relative spring

forces into account, but it is easy to design, and it is also easy to manufacture and assemble the rear derailleur 172 itself.

Second Embodiment

[0066] The control cable is frequently used in combination with a guide tube in which the control cable has been inserted. When such a control cable is used, the cable pulley 251 becomes unnecessary. A rear derailleur 172 of the second embodiment shown in Fig. 12 is an example in which a control cable with guide tube has been used. An end portion of the guide tube 253 is inserted and fixed in seats provided at each of the frame 11 and a protruded portion 213 of the base member 21, and the control cable 25 is inserted into the guide tube 253. Since the same as in the first embodiments with the exception of the foregoing, explanation concerning the structure, operation and effect which overlap will be omitted.

Third Embodiment

[0067] Fig. 13 shows a rear derailleur of the third embodiment. The first and second embodiments are predicated on the frame 11 having a derailleur installation area 111 for the exclusive use. However, since the frame 11 without such a derailleur installation area 111 for the exclusive use is also frequently used, the rear derailleur 172 of this example has a bracket member 5 for installation.

[0068] The bracket member 5 has actually the same structure

as within the framework indicated by dotted line of Fig. 5, and by combining this bracket member 5 with the rear derailleur 172 according to the first and second embodiments, a new rear derailleur 172 has been obtained. This rear derailleur 172 has a bolt through hole 51 and an axle installation hole 513, and is installed to the frame 11 by means of the bolt 52 (dotted line) and the nut attached so as to superpose the axle installation hole 513 on the axle installation hole 113. The axle installation hole 513 is cut in the same manner as the axle installation hole 113 on the frame 11 side, and is shallower than this in depth so that an outside contour between the bolt through hole 51 and the axle installation hole 513 substantially coincides with the axle installation hole 113. With the exception of a point that the relationship of the frame 11 to the rear derailleur 172 in the first and second embodiments is replaced with relationship with the bracket member 5, this is the same as in the first and second embodiments, and therefore, explanation concerning the structure, operation and effect which overlap will be omitted.

Fourth Embodiment

[0069] In the rear derailleur 172 according to the first to third embodiments, the cable pulley 251 is provided such that the center thereof is concentric with a rocking axis 1721 of the derailleur. In the case of such structure, the cable pulley

251 is limited in the size of the diameter in order to prevent interfering with the axle. To avoid such a limit, in the rear derailleur 172 of the fourth embodiment, as shown in Figs. 14 and 15, the center of the cable pulley 251 is located at a position offset with respect to the rocking axis 1721 of the derailleur.

[0070] A pulley bracket 6 is a long plate-shaped member provided with a shaft hole 61, an installation hole 62, and bent portions 63, 64. The shaft hole 61 is used to fix a pulley shaft which supports the cable pulley 251 rotatably, and the installation hole 62 is used to insert a derailleur installation bolt 211 through. The bent portions 63 and 64 are used to prevent the pulley bracket 6 from rotating by restraining them by the vehicle body 11 or the bracket member 5.

[0071] A size by which a center (coincides with the center of the through-hole 212 of the cable pulley 251) of the shaft hole 61 is offset with respect to the center of the installation hole 62, that is, a length of the pulley bracket 6 is selected, whereby the cable pulley 251 having a large diameter can be used without being limited as described above. Therefore, a movement of a control cable 25 can be made smoother through the use of the cable pulley 251 having a large diameter.

[0072] Also, since the cable pulley 251 rotates at a small angle, it can be made into a segment type. Thereby, there can be avoided a problem of interference between a stopper 252 and

the cable pulley 251 which occurs when the base member 21 is rotated during attachment and detachment.

[0073] In the foregoing description concerning the rear derailleur according to the embodiments, the description has been made of an example of the parallel link mechanism in which the link rocking axis rocking is orthogonal to the rear wheel axle axis, and even in the rear derailleur referred to as a slant type derailleur, of a form of the parallel link mechanism in which the link rocking axis rocking is inclined to the rear wheel axle axis, the principle of the present invention can be applied as it is.

[0074] According to a rear derailleur of the present invention, since the tension sprocket wheel does not come so close to the ground even when the chain is looped over a large chain wheel, an effect that accidents of a violent fall or trouble can be reduced is exhibited. Further, since it is possible to pivot the rear derailleur itself for loosening the control cable, an effect that the wheel can be easily detached and attached is exhibited. Also, an effect that an application range for the wheel size can be made wide is exhibited. Further, since there is only one biasing spring, there are exhibited effects that design concerning relative spring force of two biasing springs which the conventional rear derailleur has becomes easier, and it becomes easier to manufacture and assemble.

Further, even if the front chain wheel 16 over which the chain is looped may be changed over a range from minor diameter to major diameter, a guide sprocket 231 automatically settles in the most stable position corresponding to this diameter and no unreasonable force is exerted, and therefore, there is exhibited an effect that it is possible to maintain a stable speed variation operation.

[0075] Although only preferred embodiments are specifically illustrated and described herein, it will be appreciated that many modifications and variations of the present invention are possible in light of the above teachings and within the purview of the appended claims without departing from the spirit and intended scope of the invention.